

In the Claims:

Please amend the claims of the above-identified application so as to read as follows:

1. Cancelled, without prejudice.
2. (Currently Amended) A signal line drive circuit provided with a reference voltage chooser circuit for choosing, in accordance with tones represented by an image signal, a voltage among multiple reference voltages supplied to the signal line drive circuit to output as a signal line drive signal, wherein:
 - a second reference voltage produced by voltage division utilizing a ladder resistor from at least two first reference voltages is supplied to the reference voltage chooser circuit via a buffer circuit having a high input impedance and a low output impedance; and
 - the first reference voltages are simultaneously directly supplied to the reference voltage chooser circuit from external first reference voltage supply means, and
 - switches controlled by a control signal are interposed between the ladder resistor and power supply lines for the respective first reference voltages.

3. (Currently Amended) A signal line drive circuit provided with a reference voltage chooser circuit for choosing, in accordance with tones represented by an image signal, a voltage among multiple voltages supplied to the reference voltage chooser circuit to output as a signal line drive signal, wherein:

multiple first reference voltages are supplied simultaneously and directly from external first reference voltage supply means to the reference voltage chooser circuit;

a second reference voltage produced by voltage division utilizing ladder resistor from at least two of the first reference voltages is supplied to the reference voltage chooser circuit via a buffer circuit having a high input impedance and a low output impedance when a buffer circuit power supply voltage is supplied to the buffer circuit via a first switch controlled by a first control signal;

second switches controlled by a second control signal are interposed between the ladder resistor and power supply lines for the respective first reference voltages, and

the reference voltage chooser circuit chooses one of incoming voltages to output as a signal line drive signal in accordance with the tones represented by the image signal.

4. (Original) The signal line drive circuit as defined in claim 3, wherein
the first switch is controlled in accordance with the number of tones represented
by the image signal.

5. (Currently Amended) A signal line drive circuit, provided with a voltage chooser circuit and a voltage divider circuit including a ladder resistor for producing a second reference voltage by voltage division from at least two first reference voltages, the at least two first reference voltages being supplied simultaneously directly to the voltage chooser circuit from external first reference voltage supply means, and a buffer circuit for selectively providing the second reference voltage to the voltage chooser circuit in response to a first control signal, the signal line drive circuit outputting a signal line drive signal in accordance with tones represented by an image signal, wherein
- a second switch controlled by a second control signal is interposed between the first reference voltages and the voltage divider circuit ladder resistor, and third switches controlled by a third signal are interposed between the voltage divider circuit ladder resistor and power supply lines for the respective first reference voltages.
6. (Original) The signal line drive circuit as defined in claim 5, wherein
- the second switch is controlled in accordance with the number of tones represented by the image signal.

7. (Currently Amended) A signal line drive circuit, comprising:

- a sampling circuit for sampling an image signal so as to generate a sampling signal representative of the number of tones contained in said image signal;
 - a reference voltage chooser circuit including a ladder resistor for choosing a reference voltage in accordance with the sampling signal to output a signal line drive signal from among multiple first reference voltages simultaneously directly supplied to the reference voltage chooser circuit from external first reference voltage supply means, and a second reference voltage produced by voltage division from at least two of the first reference voltages supplied to the reference voltage chooser circuit via a buffer circuit having a high input impedance and a low output impedance;
 - switches controlled by a control signal interposed between the resistor ladder and power supply lines for the respective first reference voltages, and
 - a decoder circuit for controlling the reference voltage chooser circuit in accordance with the sampling signal;
- wherein:
- the decoder circuit is controlled by a third control signal ~~according to~~ in accordance with a decoder table ~~determined by~~ indicative of the number of tones represented by the sampling signal; and
 - the reference voltage chosen by the reference voltage chooser circuit changes in response to an output of the decoder circuit.

8. Canceled, without prejudice.

9. (Currently Amended) A signal line drive circuit including:

- a sampling circuit for sampling an image signal;
- a voltage divider circuit including a ladder resistor for producing a second reference voltage by voltage division from multiple first reference voltages from external voltage supply means supplied to the signal line drive circuit;
switches controlled by a control signal interposed between the ladder resistor and power supply lines for the respective first reference voltages, and
- a reference voltage chooser circuit for choosing one of said first or second reference voltages to output as a signal line drive signal,
the first reference voltages being supplied simultaneously directly to the reference chooser circuit and the second reference voltage being supplied to the reference voltage chooser circuit via a buffer circuit having a high input impedance and a low output impedance,
- the signal line drive circuit including a decoder circuit for controlling the reference voltage chooser circuit in accordance with the sampled signal and outputting the signal line drive signal in accordance with tones represented by the sampled signal,
- said signal line drive circuit comprising at least any one of:
 - (i) a first switch to cut off power supply to the buffer circuit;
 - (ii) a second switch interposed between the first reference voltages and the voltage divider circuit to cut off the reference voltage supplied to the voltage divider circuit; and
 - (iii) a control circuit for changing controlling said decoder circuit to change a decoder table so as to change the reference voltage chosen by the reference voltage chooser circuit in response to said sampled signal accordance with a number of tones represented by the image signal,

wherein

at least any one of the first switch, the second switch, and the control circuit is set in accordance with the number of tones represented by the image signal.

10. (Currently Amended) A signal line drive circuit including:

- a sampling circuit for sampling an image signal;
 - a voltage divider circuit including a ladder resistor for producing a second reference voltage by voltage division from at least two first reference voltages supplied to the signal line drive circuit;
 - switches controlled by a control signal interposed between the ladder resistor and power supply lines for the respective first reference voltages, and
 - a reference voltage chooser circuit for choosing one of said first or said second reference voltages to output as a signal line drive signal,
- the first reference voltages being supplied simultaneously directly to the voltage chooser circuit from external first reference voltage supply means and said second reference voltage being supplied to the reference voltage chooser circuit via a buffer circuit having a high input impedance and a low output impedance,
- the signal line drive circuit including a decoder circuit for controlling the reference voltage chooser circuit in accordance with the sampled signal and outputting the signal line drive signal in accordance with tones represented by the sampled signal,
- said signal line drive circuit comprising:
- a first switch to cut off power supply to the buffer circuit;
 - a second switch interposed between the first reference voltages and the voltage divider circuit to cut off the reference voltage supplied to the voltage divider circuit; and
 - a control circuit for ~~changing~~ controlling said decoder circuit to change a decoder table so as to change the reference voltage chosen by the reference voltage chooser circuit in accordance with a number of tones represented by the image signal ~~response to said sampled signal,~~

wherein

when the number of tones represented by the image signal is less than or equal to the number of the first reference voltages, the first switch and the second switch are both opened, and the control circuit changes the decoder table to one of the decoder tables that matches the number of tones represented by the image signal.

11. (Currently Amended) An image display device, comprising:

pixels arranged in a matrix form;
signal lines connected to the pixels;
scan lines connected to the pixels;
a scan signal line drive circuit for supplying scan signals to the scan lines for
a vertical scan; and
a signal line drive circuit for supplying signal line drive signals to the
signal lines, the signal line drive circuit including a reference voltage
chooser circuit for choosing, in accordance with tones represented by an
image signal, a first or a second reference voltage to output as the chosen
voltage,

wherein:

the second reference voltage is produced by voltage division utilizing a ladder
resistor from at least two of the first reference voltages and is supplied
to the reference voltage chooser circuit via a buffer circuit having a high
input impedance and a low output impedance; and
the first reference voltages carried by power supply lines are simultaneously
directly supplied to the reference voltage chooser circuit from external
first reference voltage supply means and the power supply lines for the
respective first reference voltages are separated from the ladder resistor
by switches controlled by a control signal.

12. (Original) A portable apparatus, comprising an image display
device as defined in claim 11.

13. (Currently Amended) An image display device, comprising:

pixels arranged in a matrix form;
signal lines connected to the pixels;
scan lines connected to the pixels;
a scan signal line drive circuit for supplying scan signals to the scan lines for
a vertical scan; and
a signal line drive circuit for supplying signal line drive signals to the
signal lines, the signal line drive circuit including a reference voltage
chooser circuit for choosing, in accordance with tones represented by an
image signal, a first or a second reference voltage to output as the
chosen voltage,

wherein:

the second reference voltage is produced by voltage division utilizing a ladder resistor from at least two of the first reference voltages and is supplied to the reference voltage chooser circuit via a buffer circuit having a high input impedance and a low output impedance;
the first reference voltages carried by power supply lines are supplied simultaneously directly to the voltage chooser circuit from an external first reference voltage source and the power supply lines for the respective first reference voltages are separated from the ladder resistor by switches controlled by a control signal; and
a buffer circuit power supply voltage is supplied to the buffer circuit via a first switch controlled by a first control signal.

14. (Original) A portable apparatus, comprising an image display
device as defined in claim 13.

15. (Currently Amended) An image display device, comprising:

- pixels arranged in a matrix form;
- signal lines connected to the pixels;
- scan lines connected to the pixels;
- a scan signal line drive circuit for supplying scan signals to the scan lines for a vertical scan; and
- a signal line drive circuit for supplying signal line drive signals to the signal lines, the signal line drive circuit including:
 - a reference voltage chooser circuit for choosing an output from among first and second reference voltages in accordance with tones represented by an image signal; and a voltage divider circuit including a ladder resistor for producing said second reference voltage by voltage division from multiple first reference voltages simultaneously directly supplied to said voltage chooser circuit from external reference voltage supply means,

wherein

- a second switches controlled by a second control signal interposed between the first reference voltages and the ladder resistor of the voltage divider circuit.

16. (Original) A portable apparatus, comprising an image display device as defined in claim 15.

17. (Currently Amended) An image display device, comprising:

- pixels arranged in a matrix form;
- signal lines connected to the pixels;
- scan lines connected to the pixels;
- a scan signal line drive circuit for supplying scan signals to the scan lines for a vertical scan; and
- a signal line drive circuit including:
 - a sampling circuit for sampling an image signal so as to generate a sampling signal representative of the number of tones contained in the image signal;
 - a reference voltage chooser circuit including a ladder resistor for choosing an output in accordance with tones represented by the sampling signal from among first reference voltages simultaneously directly supplied to the reference voltage chooser circuit from external first reference voltage supply means and a second reference produced by voltage division from at least two of the first reference voltages supplied to the reference voltage chooser circuit via a buffer circuit having a high input impedance and a low output impedance;
 - switches controlled by a control signal interposed between the ladder resistor and power supply lines for the respective first reference voltages,
 - and
 - a decoder circuit for controlling the reference voltage chooser circuit in accordance with the sampling signal, the reference voltage chooser circuit supplying signal line drive signals to the signal lines,

wherein:

- the decoder circuit is controlled by a third control signal according to in accordance with a decoder table ~~determined by~~ indicative of the number of tones represented by the sampling signal; and
- the reference voltage chooser circuit changes the chosen reference voltage in response to an output of the decoder circuit.

18. (Previously Presented) A portable apparatus, comprising an image display device as defined in claim 17.

19. (Currently Amended) An image display device, comprising:

- pixels arranged in a matrix form;
- signal lines connected to the pixels;
- scan lines connected to the pixels;
- a scan signal line drive circuit for supplying scan signals to the scan lines for a vertical scan; and
- a signal line drive circuit including:
 - a voltage divider circuit including a ladder resistor for producing a second reference voltage by voltage division from multiple first reference voltages supplied to the signal line drive circuit from external first reference voltage supply means;
 - a reference voltage chooser circuit for choosing among said first reference voltages supplied simultaneously directly thereto or a second reference voltage from said voltage divider circuit in accordance with tones represented by an image signal to output the chosen voltage;
- a sampling circuit for sampling the image signal; and
- a decoder circuit for controlling the reference voltage chooser circuit in accordance with the sampled signal, the second reference voltage being supplied to the reference voltage chooser circuit via a buffer circuit having a high input impedance and a low output impedance,

said signal line drive circuit comprising at least any one of:

- (i) a first switch to cut off power supply to the buffer circuit;
- (ii) a second switches interposed between power supply lines for the respective first reference voltages and the ladder resistor of the voltage divider circuit to cut off the reference voltage supplied to the voltage divider circuit; and
- (iii) a control circuit for ~~changing~~ controlling said decoder circuit to change a decoder table so as to change the reference voltage chosen by the reference voltage chooser circuit in accordance with a number of tones represented by the image signal,

wherein

at least any one of the first switch, the second switch, and the control circuit is set in accordance with the number of tones represented by the image signal.

20. (Previously Presented) The image display device as defined in claim 19,

wherein said control circuit comprises a setup circuit for controlling at least any one of the first switch, the second switch, and the voltage chooser circuit in accordance with a change in the number of tones represented by the image signal, so as to switch among drive modes of said image display device arbitrarily.

21. (Original) A portable apparatus, comprising an image display device as defined in claim 19.

22. (Currently Amended) An image display device including:

- pixels arranged in a matrix form;
 - signal lines connected to the pixels;
 - scan lines connected to the pixels;
 - a scan signal line drive circuit for supplying scan signals to the scan lines for a vertical scan; and
 - a signal line drive circuit including:
 - a voltage divider circuit including a ladder resistor for producing a second reference voltage by voltage division from at least two first reference voltages;
 - a reference voltage chooser circuit for choosing one of said first or second voltages in accordance with tones represented by an image signal to output as the chosen voltage;
 - a sampling circuit for sampling the image signal; and
 - a decoder circuit for controlling the reference voltage chooser circuit in accordance with the sampled signal,
- the first reference voltages being supplied simultaneously directly to the voltage chooser circuit from external first reference voltage supply means and the second reference voltage being supplied to the reference voltage chooser circuit via a buffer circuit having a high input impedance and a low output impedance, the signal line drive circuit supplying signal line drive signals to the signal lines in accordance with tones represented by the image signal sampled by the sampling circuit,

said image display device comprising:

- a first switch to cut off power supply to the buffer circuit;
- a second switches interposed between power supply lines for the
respective first reference voltages and the ladder resistor of
voltage divider circuit to cut off the reference voltage supplied to
the voltage divider circuit; and
- a control circuit for ~~changing~~ controlling said decoder circuit to change a
decoder table so as to change the reference voltage chosen by the
reference voltage chooser circuit in accordance with a number of
tones represented by the image signal;

wherein

when the number of tones represented by the image signal is less than or equal to
the number of the first reference voltages, the first switch and the second
switch are both opened, and the control circuit switches the decoder
table to a decoder table that matches the number of tones represented by
the image signal.

23. (Previously Presented) The image display device as defined in claim 22,

wherein said control circuit comprises a setup circuit for controlling at least any
one of the first switch, the second switch, and the voltage chooser circuit in
accordance with a change in the number of tones represented by the image signal,
so as to switch among drive modes of said image display device arbitrarily.

24. (Original) A portable apparatus, comprising an image display device
as defined in claim 22.